MULTIMEDIA UNIVERSITY

STUDENT ID NO

MULTIMEDIA UNIVERSITY

FINAL EXAMINATION

TRIMESTER 2, 2015/2016

DPJ5018 – PROGRAMMING IN JAVA

(DIT only)

3 MARCH 2016
9.00 a.m – 11.00 a.m
(2 Hours)

INSTRUCTIONS TO STUDENTS

1. This question paper consists of **ELEVEN (11) pages** excluding the cover page.

2. There are **THREE (3) sections (60 Marks)**:

   Section A: TEN (10) Multiple Choice Questions (10 Marks)
   Section B: FIVE (5) Structured Questions (25 Marks)
   Section C: TWO (2) Application Questions (25 Marks) ***(Attempt ONE (1) question only)***

3. Write **ALL** your answers in the Answer Booklet provided.

Section A: Multiple Choice Questions (Total: 10 Marks)

Instructions: Choose the best answer. Write your answers in the Answer Booklet provided.

1. _____ develops applications running on embedded and mobile devices.

   A. Java ME
   B. Java EE
   C. Java SE
   D. JavaScript

2. Which of the following is **NOT** a primitive data type in Java?

   A. char
   B. boolean
   C. byte
   D. String

3. What is the output of the following statements?

```
double average = 51 / 2;
System.out.print(average);
```

   A. 25.5
   B. 25
   C. 25.0
   D. An error occurred.

4. Which of the following is an **INCORRECT** method call for the method with the header below?

```
public static double manageNumbers(int x, double y)
```

   A. double a = manageNumbers(5, 10);
   B. double a = manageNumbers(5, 10.0);
   C. double a = manageNumbers(8-3, 10);
   D. double a = manageNumbers(5.0, 10.0);

5. In managing runtime errors, handling code in the _____ is separated from the main logic in the _____.

   A. finally-block, throw-block
   B. catch-block, try-block
   C. throw-block, catch-block
   D. try-block, catch-block

Continued.....

6. What is the output of the following statements?

```
int a = 2, b = 3;
while(a + b >= 5){
    a = 1;
    int c = a + b;
}
System.out.print("The sum is " + a + c);
```

A. The sum is 4
B. The sum is 14
C. The sum is 5
D. An error occurred.

7. Given the following arrays, what are the elements stored in the *newArray* array after the execution of the statement below?

Arrays:
```
int[] oldArray = {1,2,3,4};
int[] newArray = {5,6,7,8};

System.arraycopy(oldArray,2,newArray,1,2);
```

A. 2, 3, 7, 8
B. 5, 3, 7, 8
C. 5, 3, 4, 8
D. 5, 6, 7, 8

8. A(n) _____ is shared by all instances of the same class.

A. instance variable
B. static variable
C. object
D. instance data field

9. Which of the following is the **CORRECT** method to draw a filled square with the upper-left corner at (20, 30).

A. fillRect(20,30,50,50)
B. drawRect(20,30,50,50)
C. fillRect(50,50,20,30)
D. drawRect(50,50,20,30)

10. In a Java applet, the _____ method is invoked after the _____ method.

A. init, destroy
B. init, start
C. start, init
D. start, destroy

Continued.....

Section B: Structured Questions (Total: 25 Marks)

Instructions: Answer ALL questions. Write your answers in the Answer Booklet provided.

Question 1

Given that $\pi = \frac{22}{7}$, write a static method named `calConeVolume` that calculates the volume of a cone using the following formula:

$$volume = \frac{1}{3}\pi r^2 h$$

This method has two `double` parameters, `r` which is radius and `h` which is height. This method returns a `double` which is the volume of the cone. (5 marks)

[TOTAL: 5 MARKS]

Question 2

`arrMarks` is an array of `int` type which stores the test marks of five students. `arrGrade` is an array of `char` type which will be used to store the test grade of the five students.

```
int[] arrMarks = {75, 100, 45, 50, 69};
char[] arrGrade = new char[5];
```

Write a loop to determine the test grade for the five students by referring to Table 1, and individually store the grades into the array `arrGrade`. (5 marks)

Marks	Grade
80 and above	A
70 - 79	B
50 - 69	C
Below 50	F

Table 1

[TOTAL: 5 MARKS]

Continued.....

Question 3

Determine the output of the following program (***Program A***) in Figure 1. (5 marks)

```
class Instrument {
    String x = "The xylophone";

    public Instrument(){
       System.out.println(x + " is a percussion instrument.");
    }

    public Instrument(String x){
       System.out.println("Some say it originated in southeast
Asia.");
    }
}

class Wind extends Instrument {

    public Wind(){
       System.out.println("Didgeridoo is widely used in
Australia.");
    }

    public Wind(String x){
       this();
       System.out.println(x + " is a brass instrument.");
    }
}

class Stringed extends Instrument {
    String x = "The bandurria";

    public Stringed(){
       System.out.println(x + " is commonly used in Spanish
folk music.");
    }

    public Stringed(String x){
       System.out.println(x + " is also used in South
America.");
    }
}

public class Q2 {
    public static void main (String [] args){
       Instrument one = new Wind("The cimbasso");
       Stringed two = new Stringed();
    }
}
```

Figure 1. ***Program A***

[TOTAL: 5 MARKS]

Continued.....

Question 4

Write Java code to create a combo box with the following properties. Refer to Figure 2 for sample output. (5 marks)

- Four options of seasons: Spring, Summer, Autumn, Winter
- Font name: Arial
- Font style: Bold
- Font size: 16
- Font color: red

Figure 2

[TOTAL: 5 MARKS]

Question 5

Determine the output of the program (***Program B***) in Figure 3 if the user enters the following inputs.

a)

- Name: ***Azmi***
- Monthly fee payment: ***50*** (1.5 marks)

b)

- Name: ***Kevin***
- Monthly fee payment: ***80***
- Batch code: ***103***
- Package code: ***A101*** (3.5 marks)

Continued.....

```
import java.util.*;
public class ExceptionTest{
    public static void main (String [] args){
        try{
            getStudDetails();
            System.out.print("Enter your Monthly Fee Payment
(RM): ");
            double fees = new Scanner(System.in).nextDouble();
            if  (fees < 60)
                throw new RuntimeException("Minimum Monthly Fee
is RM60");

            System.out.println("Batch Code: 101 || 102 || 103");
            System.out.print("Enter Batch Code: ");
            int batch = new Scanner(System.in).nextInt();
            double batchCode = batch;
            System.out.println("Your new Batch Code: " +
batchCode);
            System.out.print("Enter Package Code: [ 101 : RM60
|| 102 : RM80 || 103 : RM100 ] : ");
            String code = new Scanner(System.in).next();
            System.out.println("Code: "+
Integer.parseInt(code));
        }
        catch (NumberFormatException e){
            System.out.println("Wrong format");}
        catch (Exception e){
            System.out.println("Error: "+ e.getMessage());}
    }

    public static void getStudDetails(){
        try{
            System.out.print ("Type your Name: ");
            String name = new Scanner(System.in).next();
        }
        catch (InputMismatchException e){
            System.out.println("Wrong data input");}
    }
}
```

Figure 3. ***Program B***

[TOTAL: 5 MARKS]

Continued.....

Section C: Application Question (Total: 25 Marks)

*Instructions: Answer **ONE (1)** question only. Write your answers in the Answer Booklet provided.*

Question 1 (25 marks)

Perform the following instructions by referring to the UML diagram of the classes as shown in Figure 4a and the sample output as shown in Figure 4b.

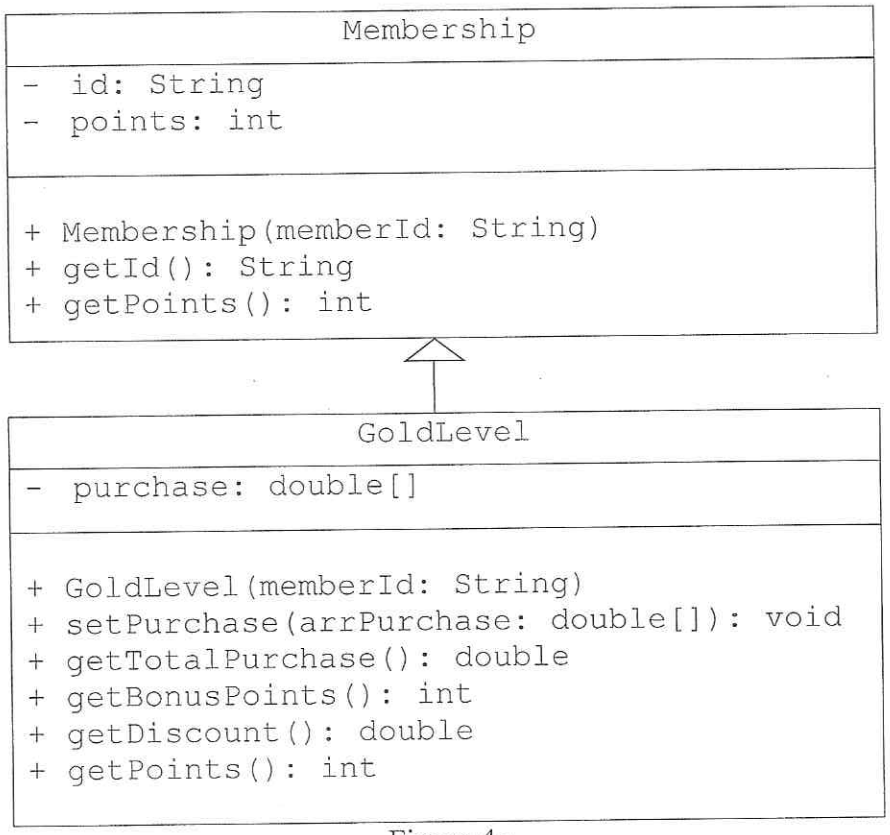

Figure 4a

Continued.....

```
Enter member ID: 123123

Enter the purchase amount of each month:
Month 1: RM50
Month 2: RM100.5
Month 3: RM2300
Month 4: RM0
Month 5: RM1500
Month 6: RM75.5
Month 7: RM700
Month 8: RM0
Month 9: RM3000
Month 10: RM0
Month 11: RM200
Month 12: RM555.5

Member Details:
--------------------
Member ID: 123123
Total Purchase Amount: RM8481.50
Bonus Points: 42
Total Points Earned: 1042
Discount Amount: RM848.15
```

Figure 4b

Write a class named `Membership` which consists of the following data fields and methods:

- Data fields:
  - `id`: Stores the member ID.
  - `points`: Stores the points earned by the member. (Default points = 1000)
- The `Membership(...)` constructor accepts the member ID and assigns it to the appropriate data field.
- Methods:
  - `getId()`: Returns the member ID.
  - `getPoints()`: Returns the points.

Continued.....

Write a class named `GoldLevel` which is a subclass of `Membership`. The `GoldLevel` class consists of the following data field and methods:

- Data field:
  - `purchase`: An array that stores the member's purchase amount in a year by month.

- The `GoldLevel(...)` constructor accepts the member ID and calls the superclass's constructor to set the data field for this member.

- Methods:
  - `setPurchase(...)`: Sets the member's purchase amount of each month.
  - `getTotalPurchase()`: Calculates and returns the total purchase amount in a year.

  - `getBonusPoints()`: Calculates and returns the bonus points earned by the member. A Gold member is eligible for bonus points. The bonus points are calculated based on the total purchase amount *(the member will earn 1 bonus point for every RM 200 spent on the purchases)*.

  - `getDiscount()`: Calculates and returns the discount amount. The discount amount is calculated based on the total purchase amount. Gold members can enjoy a discount on their next purchase if the total purchase amount of the current year exceeds RM5000. The discount is 10% of the total purchase amount.

  - `getPoints()`: Overrides the superclass's method to calculate and return the total points earned by the member. The total points include the default points and the bonus points.

Write a class named `Testing` to test the `GoldLevel` class.

- Prompt the user to enter the member ID.
- Create an object of `GoldLevel` with the member ID.
- Create an array of size 12 to store the purchase amount of each month in a year.
- Prompt the user to enter the purchase amount of each month and store each value into the array.
- Call the `setPurchase(...)` method and pass the array to the method.
- Display the following member details by calling the appropriate methods:

  - Member ID
  - Total purchase amount of the year
  - Bonus points earned by the member
  - Total points (including default points and bonus points) earned by the member
  - Discount amount

[TOTAL: 25 MARKS]

Continued.....

Question 2 (25 marks)

Write a program to help ABC Waffle to calculate the total amount to be paid by a customer. Customers can only choose one flavor *(Refer to Table 2)*. They may add none, one or more toppings *(Refer to Table 3)*. Customers may upsize a waffle to premium with an extra charge of RM2. Customers can enjoy a 5% discount if they purchase more than five waffles.

Waffle Flavor	Price (RM)
Chocolate	3.00
Mango	4.50

Table 2. Price of waffle

Toppings	Price (RM)
Ice cream	2.00
Fruit	1.50

Table 3. Price of toppings

When the "*Order*" button is clicked, the program calculates and displays the subtotal, discount and total amount to be paid. A sample run of the program is shown in Figure 5a and 5b.

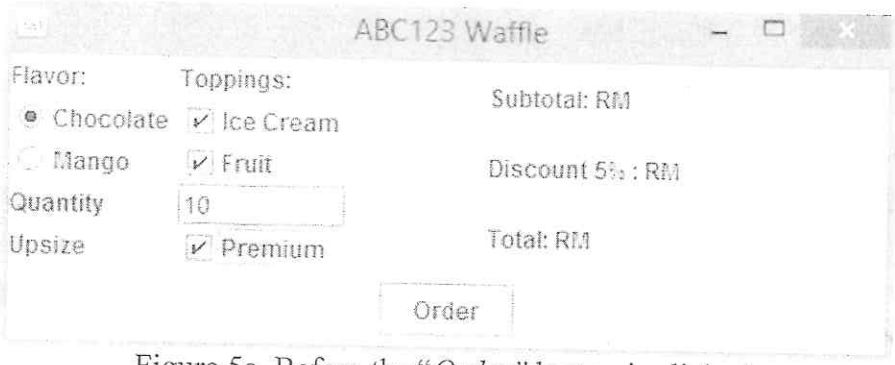

Figure 5a. Before the "*Order*" button is clicked.

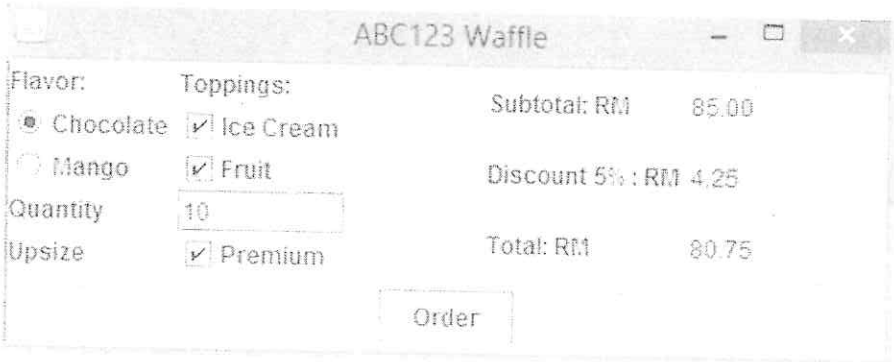

Figure 5b. After the "*Order*" button is clicked.

Continued.....

Refer to the following details and Figure 5c to create the user interface:

- The size of the frame is 450 x 180.
- Panel 1 is added to the west of the frame.
- Panel 2 is added to the south of the frame.
- Panel 3 is added to the east of the frame.

Panel 1
(GridLayout with 5 rows and 2 columns)

"Flavor" Label	*"Toppings"* Label
"Chocolate" Radio button	*"Ice cream"* Check box
"Mango" Radio button	*"Fruit"* Check box
"Quantity" Label	*"Quantity"* Text field
"Upsize" Label	*"Premium"* Check box

Panel 3
(GridLayout with 3 rows and 2 columns)

"Subtotal" Label	*"Subtotal"* Text field
"Discount" Label	*"Discount"* Text field
"Total" Label	*"Total"* Text field

Panel 2

"Order" Button

Figure 5c. The layout of the panels

[TOTAL: 25 MARKS]

End of Page.